

WHAT IS CLAIMED IS:

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1. An ink jet printing apparatus for forming an image on a print medium by using a print head, the print head having a plurality of nozzle groups, each having a plurality of nozzles, the ink jet printing apparatus comprising:

means for performing a plurality of main scans on one and the same main scan print area of the print medium using different nozzle groups and for forming a thinned out image according to a thinning out mask pattern in each of the plurality of main scans to complete an image; and

printing duty setting means for dividing the same main scan print area at a predetermined pitch in a subscan direction different from a main scan direction and for setting printing duties of the divided areas determined by the thinning out mask pattern to different values.

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2. An ink jet printing apparatus according to claim 1, wherein the printing duty setting means sets the printing duties of the divided areas in the same main scan print area situated at the ends of the print head to smaller values than those of the divided areas situated on the inner side of the ends of the print

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head, the same main scan print area being formed by the plurality of the main scans.

3. An ink jet printing apparatus according to
5 claim 1, wherein the thinning out mask pattern has a lower resolution than that of an image being printed.

4. An ink jet printing apparatus according to
10 claim 1, wherein the thinning out mask pattern is a pseudo-periodical mask pattern in which, when pixels are digitized according to an arbitrary level, unprinted pixels and printed pixels are uniformly distributed.

15 5. An ink jet printing apparatus according to claim 1, wherein the print head has a plurality of nozzle columns corresponding to color inks and ejects ink droplets according to color print data to form a color image.

20 6. An ink jet printing apparatus according to claim 1, further including a striped density variation amount detection means for detecting an amount of striped density variation occurring in an image formed
25 by the print head, wherein the striped density variation amount detection means has a control unit to cause the print head to print a predetermined test

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image, a reading unit to read the printed test image
by using an optical sensor, a calculation unit to
determine the amount of striped density variation of
the print head based on the result of the reading, and
5 a register to store the calculated result produced by
the calculation unit.

7. An ink jet printing apparatus according to
claim 1, wherein an amount of ink ejected from each
10 nozzle of the print head in one ejection operation is
4 pl or less.

8. An ink jet printing apparatus according to
claim 1, wherein dots formed by ink ejected from each
15 nozzle of the print head in one ejection operation
have an average diameter of 50 μ m or less.

9. An ink jet printing apparatus according to
claim 1, wherein the print head forms dots at a print
20 density of 600 dpi or higher.

10. An ink jet printing apparatus according to
claim 1, wherein the print head generates bubbles in
ink by thermal energy and ejects ink by a pressure of
25 the bubbles.

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11. An ink jet printing method for forming an image on a print medium by using a print head, the print head having a plurality of nozzle groups, each having a plurality of nozzles, the ink jet printing method comprising the steps of:

performing a plurality of main scans on one and the same main scan print area of the print medium using different nozzle groups and forming a thinned out image according to a thinning out mask pattern in each of the plurality of main scans; and

dividing the same main scan print area at a predetermined pitch in a subscan direction different from a main scan direction and setting printing duties of the divided areas determined by the thinning out mask pattern to different values.

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12. An ink jet printing method according to claim 11, wherein, of the same main scan print area formed by a plurality of main scans, the divided areas corresponding to the ends of the print head have their printing duties set smaller than those of the divided areas on the inner side of the ends of the print head.

13. An ink jet printing method according to claim 11, wherein the thinning out mask pattern has a lower resolution than that of an image being printed.

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14. An ink jet printing method according to
claim 11, wherein the thinning out mask pattern is a
pseudo-periodical mask pattern in which, when pixels
are digitized according to an arbitrary level,
5 unprinted pixels and printed pixels are uniformly
distributed.

15. An ink jet printing method according to
claim 11, wherein the print head has a plurality of
10 nozzle columns corresponding to color inks and ejects
ink droplets according to color print data to form a
color image.

16. An ink jet printing method according to
15 claim 11, further including a step of detecting an
amount of striped density variation occurring in an
image formed by the print head, wherein the striped
density variation amount detection step has a step of
causing the print head to print a predetermined test
20 image, a step of reading the printed test image by
using an optical sensor, a calculation step of
determining the amount of striped density variation of
the print head based on the result of the reading, and
a step of storing the calculated result produced by
25 the calculation step.

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17. An ink jet printing method according to claim 11, wherein the print head generates bubbles in ink by thermal energy and ejects ink by a pressure of the bubbles.

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18. A printing control method for an ink jet printing apparatus, the ink jet printing apparatus having a plurality of nozzle groups, each having a plurality of nozzles, the printing control method

10 comprising the steps of:

providing the printing apparatus;

performing a plurality of main scans on one and the same main scan print area of the print medium using different nozzle groups and forming a thinned
15 out image according to a thinning out mask pattern in each of the plurality of main scans; and

dividing the same main scan print area at a predetermined pitch in a subscan direction different from a main scan direction and setting printing duties
20 of the divided areas determined by the thinning out mask pattern to different values.

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